

## SWRO FRATECH

### SEA WATER

### REVERSE OSMOSIS DESALINATION SYSTEM

#### MARINE APPLICATION



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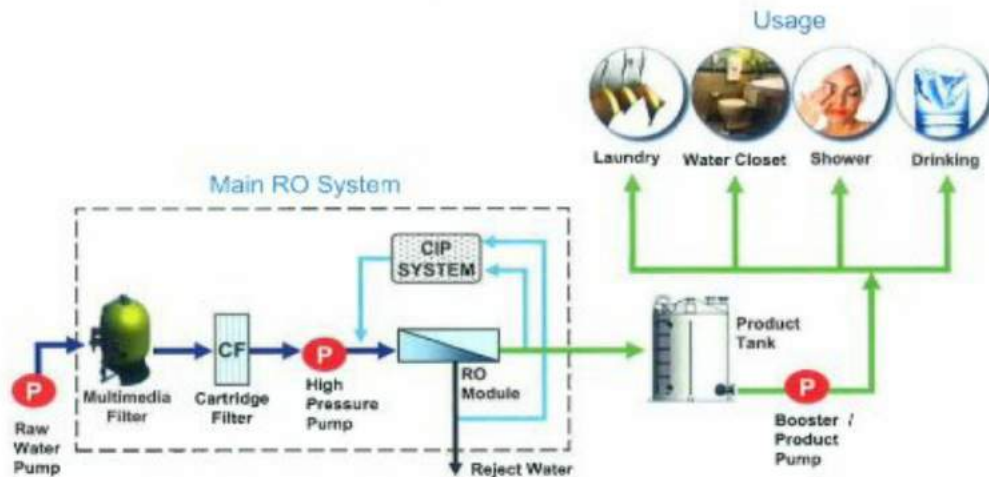
## INTRODUCTION

FRATECH has been designing and manufacturing advanced Seawater Desalination Systems Watermakers for the on-shore and off-shore industries.

Onshore Fresh SWRO Watermakers, designed for land use, can be fed directly from the sea or any beach well and will convert seawater or salty brackish water to pure fresh drinking water. These systems are perfect for locations with no fresh or municipal water supplies such as remote areas, or smaller atolls and islands having no potable water sources. marine off-shore fresh watermakers convert seawater fed directly from the sea into drinking water quality and suit most boats, yachts, oceangoing industrial vessels and military ships.

Seawater Desalination makes seawater pure drinking water. For best Seawater Desalination Systems, Seawater Desalination Fresh Watermakers, SWRO Watermakers

## GENERAL PROCESS FLOW DIAGRAM



### Notes :

\* CIP - Cleaning In Place

## TYPICAL SPECIFICATIONS OF SWRO DESALINATION SYSTEMS

Model SWRO	Product Water Flow (m <sup>3</sup> /day)	Feed Water Flow (m <sup>3</sup> /day)	Main RO Skid Dimension (L x W x H) (m x m x m)	Overall* Floor Space (m <sup>2</sup> )	Overall* Shipping Weight (kg)	Overall* Electrical Loading (kw)	Overall* Power Consumption (kwh/day)
<b>STANDARD SERIES</b>							
5T	5	33	1.0 x 0.8 x 1.7	2	600	4	88
10T	10	33	2.8 x 0.9 x 1.6	5	900	4	92
20T	20	80	2.8 x 1.0 x 1.5	6	1,600	8	180
30T	30	100	4.2 x 1.2 x 1.9	9	2,100	12	275
50T	50	167	3.2 x 1.2 x 2.0	10	2,700	15	345
<b>ENERGY SAVING SERIES</b>							
75T-TB	75	215	4.0 x 1.3 x 1.9	15	3,200	18	390
100T-TB	100	250	4.7 x 1.3 x 1.9	20	3,800	22	480
150T-PX	150	375	4.0 x 1.3 x 1.9	28	4,500	25	540
200T-PX	200	500	5.0 x 1.5 x 2.0	36	5,500	31	660
300T-PX	300	750	7.2 x 1.5 x 2.0	42	8,500	58	1,180

### Notes:

\* Overall system includes main RO system which comes with Pre-treatment, Post-treatment and CIP systems.  
TB - Turbocharger, PX: Pressure Exchanger





# PT. FRATECH REKATIRTA ANDALAN

## WATER, WASTEWATER & ENGINEERING

### STANDARD SERIES

Customized design to fit into existing vessel  
 Compact and flexible modular units  
 Built-in cleaning and flushing system in main skid  
 Module disinfectant dosing system

### ENERGY SAVING SERIES

Energy and cost efficient with energy recovery device  
 Control panels with PLC for easy control (for PX series)  
 Designed for ease of shipping  
 Minimum site works required

### GENERAL FEATURES AND BENEFITS

Fast delivery with strong in-house fabrication capability  
 Fail safe unattended operation

High reliability with excellent service support  
 High quality product water

## TYPICAL WATER QUALITY OF SWRO DESALINATION SYSTEMS

ION	CONCENTRATION (ppm)		ION	CONCENTRATION (ppm)	
	FEED	PRODUCT		FEED	PRODUCT
Ca <sup>2+</sup>	440	0.654	CO <sub>3</sub> <sup>2-</sup>	0.8	0.001
Mg <sup>2+</sup>	1418	2.107	HCO <sub>3</sub> <sup>-</sup>	160	1.841
Na <sup>+</sup>	11876.9	84.579	SO <sub>4</sub> <sup>2-</sup>	2976	4.767
K <sup>+</sup>	420	3.737	Cl <sup>-</sup>	21320	136.45
Ba <sup>2+</sup>	0.055	0.0	F <sup>-</sup>	1.5	0.019
Sr <sup>2+</sup>	14	0.021	B	4.5	0.777
NH <sub>4</sub> <sup>+</sup>	0.1	0.0	SiO <sub>2</sub>	8.0	0.04
TDS	38640	235	pH	8	6.5-7.5

#### Design Criteria:

- 1) Recovery: 40%
- 2) Feed water temperature: 25°C
- 3) Product TDS meets WHO Guidelines for Drinking Water Quality

## OPTIONAL FEATURES

- Raw water / product water pumps
- Product water tank
- Containerized unit
- Dismantlable skid
- UV disinfection system
- ABS / Lloyd classification



Containerized Unit



SWRO 20T - Customized Unit



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# SWRO FRATECH

## SWRO SYSTEM EXPLODED VIEW

(Model SWRO 200T-PX)

### Cartridge/Bag Filter

The cartridge/bag filter is used to prevent particulate matter from entering the RO membranes.

### Frequency Inverter Device

The frequency inverter is used to control the pump speed and save energy.

### Electrical Control Panel

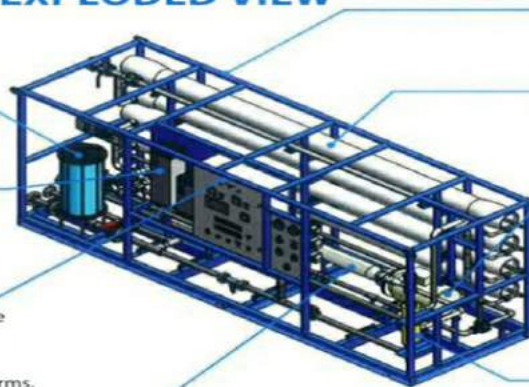
The PLC\* + HMI\* is installed on the control panel for easy operation. It has data logging function and it records the key RO operation parameters, time of start/stop, alarms, CIP and flushing date and time.

### Booster Pump

The booster pump is installed to compensate the pressure difference between the energy recovery stream and the RO high pressure pump stream. It is made of stainless steel such as 904L.

### Notes:

\* PLC - Programmable Logic Controller HMI - Human Machine Interface GRP - Glass-reinforced Plastic



### RO Skid

The RO skid is made of mild steel material. It is sand blasted and coated (3 layers of coating).

### Pressure Vessels & Membranes

The pressure vessels are made of GRP\* material. The high performance RO membranes are installed in the pressure vessels.

### RO High Pressure Pump

The high efficiency RO high pressure pump is installed to pressurize the RO feed water to overcome the osmotic pressure and push the product water through the RO membrane. It is made of stainless steel such as 904L.

### Energy Recovery Device

The energy recovery device is used to recover the energy from the reject stream of the RO system. It saves up to 60% of the energy consumption for the RO system.

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